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- 1. A method for selecting a mutant miniature plant having a desired trait, comprising the steps of:
- (a) providing a population of miniature plants, wherein said miniature plants have the following characteristics: (i) reduced size in comparison to a commercial plant of the same species; (ii) maturation to produce viable seeds or tubers at a plant density of at least ten-fold higher than standard growth conditions used for a commercial plant of the same species; and (iii) capable of being crossed with a commercial plant of the same species;
- (b) generating mutant miniature plants in said miniature plant population by treating said miniature plants with a mutation-inducing agent to produce a mutagenized miniature plant population; and
- (c) selecting a mutant miniature plant having said desired trait within said mutagenized miniature plant population.
 - 2. The method of claim 1, wherein said population of miniature plants is generated by natural or induced mutation, by genetic engineering, or by treatment with plant growth factors.
 - 3. The method of claim 2. wherein said miniature plant is a miniature tomato cultivar.
- 4. The method of claim 1, wherein said commercial plant of the same species is used to produce food, fiber or flowers.
 - 5. The method of claim 4, wherein said commercial plant of the same species is a plant which produces a berry type fruit or a plant of the Solanaceae family.
- 30 6. The method of claim 5, wherein said commercial plant produces a berry-type fruit selected from tomato, grape, prune, eggplant citrus fruits, apple.

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7. The method of claim 1, wherein said mutation-inducing agent in step (b) is a chemical mutagen selected from the group consisting of ethyl methanesulfonate (EMS), methyl methanesulfonate (MMS), methyl-N-nitrosourea (MNU), and bleomycins.

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- 8. The method of claim 1, wherein said mutation-inducing agent in step (b) is irradiation selected from the group consisting of UV, γ-irradiation, X-rays, and fast neutrons.
- 10 9. The method of claim 1, wherein said mutation-inducing agent in step (b) is a mobile DNA sequence which is selected from the group consisting of a T-DNA and a transposable element.
- 10. The method of claim 9, wherein said transposable element is selected from the group consisting of an autonomous transposon, a non-autonomous transposon, and an 15 autonomous/non-autonomous transposon system.
 - The method according to claim 10, where said transposable element is the 11. maize Ac/Ds transposable element.

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- A mutant miniature plant selected by the method of any one of claims 1 to 14. 12.
- The mutant miniature plant of claim 12, wherein said miniature plant is a 13. miniature tomato cultivar.

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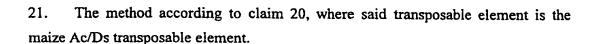
A mutant miniature plant population wherein a miniature plant of said population has the following characteristics: (i) reduced size in comparison to a commercial plant of the same species; (iii) matures to produce viable seeds or tubers at a density of at least ten-fold higher than standard growth conditions used for a commercial plant of the same species; (iii) capable of being crossed with a commercial plant of the same species; and (iv) carries a mutation induced by an agent selected from the group consisting of a chemical mutagen, irradiation, and a mobile DNA sequence.



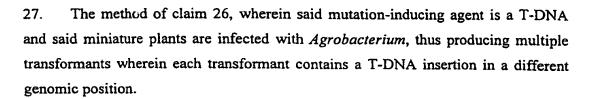
- The mutant miniature plant population of claim 14, wherein said commercial 15. plant of the same species is used to produce food, liber or flowers.
- The mutant miniature plant population of claim 15, wherein said commercial 5 16. plant of the same species is a plant which produces a berry-type fruit or a plant of the Solanaceae family.
- The mutant miniature plant population of claim 16, wherein said commercial 17. plant produces a berry-type fruit selected from tomato, grape, prune, eggplant citrus 10 fruits, apple.
 - A method for identifying a miniature plant containing a mobile DNA sequence 18. inserted into a gene of interest comprising the steps of:
- providing a population of miniature plants, wherein said miniature plants have the following characteristics: (i) reduced size in comparison to a commercial plant of the same species; (ii) maturation to produce viable seeds or tubers at a plant density of at least ten-fold higher than standard growth conditions used for a commercial plant of the same species; and (iii) capable of being crossed 20 with a commercial plant of the same species;
 - generating mutant plants in said miniature plant population by treating (b) said plants with a mobile DNA sequence;
 - screening DNA extracted from said mutant plants with PCR using a (c) first primer corresponding to a nucleotide sequence of said mobile DNA sequence and a second primer corresponding to a nucleotide sequence of said gene of interest; and
 - identifying a miniature plant comprised of DNA which produces a PCR product in the presence of said first and second primers.
- The method of claim 18, wherein said miniature plant is a miniature tomato 19. 30 cultivar.
 - 20. The method of claim 18, wherein said mobile DNA sequence is selected from the group consisting of a T-DNA or a transposable element.

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- 5 22. A method for producing a mutant population of a miniature plant comprising the steps of:
 - (a) providing a population of miniature plants, wherein said miniature plants have the following characteristics: (i) reduced size in comparison to a commercial plant of the same species; (ii) maturation to produce viable seeds or tubers at a plant density of at least ten-fold higher than standard growth conditions used for a commercial plant of the same species; and (iii) capable of being crossed with a commercial plant of the same species; and
 - (b) generating mutant plants in said miniature plant population by treating said plants with a mutation-inducing agent to produce said mutant population of said miniature crop plant cultivar.
 - 23. The method of claim 22, wherein said population of miniature plants is generated by natural or induced mutation, by genetic engineering, or by treatment with plant growth factors.
 - 24. The method of claim 22, wherein said mutation-inducing agent in step (b) is a chemical mutagen selected from the group consisting of ethyl methanesulfonate (EMS), methyl methanesulfonate (MMS), methyl-N-nitrosourea (MNU), and bleomycins.
 - 25. The method of claim 22, wherein said mutation-inducing agent in step (b) is irradiation selected from the group consisting of UV, γ -irradiation, X-rays, and fast neutrons.
- 30 26. The method of claim 22, wherein said mutation-inducing agent in step (b) is a mobile DNA sequence selected from the group consisting of a T-DNA or a transposable element.



- 28. The method of claim 26, wherein said mutation-inducing agent is a transposon and the mutant miniature plant population is obtained from the progeny of miniature plants containing an active transposition system.
- 10 29. The method of claim 28, wherein said active transposition system is a plant native transposon or a transposon introduced into the plant by genetic engineering techniques.
- 30. The method of claim 29, wherein said active transposition system is selected from an autonomous transposon, and a transposable element obtained by crossing a plant containing a non-autonomous transposon with either a transposase source or with a plant containing an autonomous transposon.
- 31. The method according to claim 29, wherein said transposable element 20 comprises the maize Ac/Ds transposon system.
 - 32. The method of claim 22 to 31, wherein said miniature plant is a miniature tomato cultivar.

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- 25 33. A method for identifying a nucleotide sequence which controls plant gene expression comprising the steps of:
 - (a) transforming a miniature plant with a DNA construct to produce a population of randomly mutagenized plants, wherein said DNA construct comprises a gene sequence encoding a screenable marker which lacks a promoter or contains a minimal promoter, said gene sequence being cloned within the borders of a mobile DNA sequence, wherein said miniature plant has the following characteristics: (i) reduced size in comparison to a commercial plant of the same species; (ii) maturation to produce viable seeds or tubers at a plant density of at least ten-fold higher than

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standard growth conditions used for a commercial plant of the same species; and (iii) capable of being crossed with a commercial plant of the same species to produce a population of randomly mutagenized plants;

- (b) identifying a miniature plant within said plant population which is transformed with said DNA construct and expresses said screenable marker; and
- (c) cloning the nucleotide sequence which is operably linked to said gene encoding said screenable marker from the total DNA isolated from said miniature plant identified in step (b).
- 10 34. The method of claim 33, wherein said screenable marker is selected from GUS and luciferase.
 - 35. The method of claim 33 or 34, wherein said mobile DNA sequence is a T-DNA or a transposable element.
 - 36. The method of claim 33, wherein said nucleotide sequence which controls plant gene expression is a promotor or enhancer.

37. A method for producing a mutant population of a commercial plant with a desired trait, which comprises the steps of:

- (a) crossing a mutant miniature plant selected according to the method of claim 1 having said desired trait, with a commercial plant of the same species; and
- (b) selecting progeny which resemble the commercial parent plant and express said desired trait.
- 38. The method of claim 37, wherein said commercial plant is used to produce food, fiber or flowers.
- 39. The method of claim 38, wherein said commercial plant is a plant which produces a berry-type fruit or a plant of the Solanaceae family.
 - 40. The method of claim 39, wherein said commercial plant produces a berry-type fruit selected from tomato, grape, prune, eggplant citrus fruits, apple.



- 41. A commercial plant having a desired trait produced by the method of claim 37.
- 42. The commercial plant of claim 41, wherein said commercial plant is used to produce food, fiber or flowers.
- 43. The commercial plant of claim 42, wherein said commercial plant is a plant which produces a berry-type fruit or a plant of the Solanaceae family.
- 44. The method of claim 43, wherein said commercial plant produces a berry-type fruit selected from tomato, grape, prune, eggplant citrus fruits, apple.